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AN INVESTIGATION OF THE PREVALENCE OF TRACHOMA IN THE STATE OF MINNESOTA.

By TALIAFERRO CLARK, Surgeon, United States Public Health Service.

Three surveys have been made since May 1, 1912, to determine the prevalence of trachoma among certain elements of the population in the State of Minnesota. Two of these surveys were made at the request of the State board of health.

The first survey occupied the month of May, 1912. It consisted of a preliminary survey of portions of the White Earth and Leech Lake Indian Reservations to define the reported prevalence of trachoma among the Indian population of the State, of an examination of a number of public-school children in towns contiguous to Indian reservations to determine the relative disease status of the neighboring white and Indian population, and, lastly, of an examination of a number of miners at various locations on the Mesaba and Vermilion iron ranges.

The public-school children of most of the towns of the Mesaba Range, St. Louis and Itasca Counties, were also examined to determine the spread of the disease from the minor to the general population of that section of the State.

A second survey was made between October 4 and November 15, 1912. This survey was of the Indian population and was made in compliance with the act of Congress approved August 24, 1912, making appropriation for the current and contingent expenses of the Bureau of Indian Affairs, containing the following provision:

Provided, That the sum of \$10,000, or as much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to enable the Public Health and Marine-Hospital Service to make a thorough examination as to the prevalence of tuberculosis, trachoma, smallpox, and other contagious and infectious diseases among the Indians of the United States, full report to be made to Congress not later than February 1, 1913, with such recommendations as may be deemed advisable.

A final survey was made by order of the Surgeon General of the Public Health Service at the request of the Minnesota State Board of Health. This survey consisted of an examination of school children, public and parochial, at various points within the State, of the pupils of the various State normal schools, of the students of the State agricultural school at Minneapolis, of the inmates of the various State penal and reformatory institutions, and of the schools for the deaf, blind, and feeble-minded.

This investigation commenced March 7, 1913, and was completed by April 18, 1913.

A glance at the accompanying maps will show that these surveys are the most extensive yet undertaken in any one State of the Union for the determination of the prevalence of trachoma.

The examinations were confined to no one particular part of the cosmopolitan population of the State, but embraced all elements at points widely separated. It is therefore believed that the results of these surveys are representative.

In this report the trachoma situation of the State is discussed under the following headings:

- I. Trachoma among the Indians.
- II. Survey of public schools in the vicinity of Indian reservations.
- III. Trachoma on the Mesaba and Vermilion iron ranges, St. Louis and Itasca Counties.
- IV. Trachoma in schools and State institutions.

The undue prevalence of trachoma among Indians of Minnesota and other States had been brought to attention early in 1912, and on April 10 of that year the Minnesota State Board of Health requested the cooperation of the Public Health Service in investigations to determine the prevalence of the disease among citizens of the State. Following these investigations the American Medical Association at its meeting in Atlantic City, June 3-7, 1912, by resolution requested the Public Health Service to conduct a nation-wide investigation of the disease.

Arriving aliens afflicted with trachoma were not deported because of the disease prior to its classification by the Secretary of the Treasury in 1897 as a dangerous contagious disease. Thousands of cases were imported among arriving immigrants prior to 1897. It therefore becomes necessary to seek the foci of infection established by these cases and to stamp them out wherever found.

Infected foci also receive additions through those who gain entry to the country in an illegitimate way. Over 30,000 desertions by foreign seamen are reported annually to the immigration authorities. A considerable percentage of the deserters who have been subsequently apprehended have been found afflicted with trachoma.

Nature, Course, and Treatment of Trachoma.

Trachoma is a dangerous contagious disease of the eyes. Under favorable conditions it may spread widely in a community.

Untreated, 90 per cent of the cases of this disease result in some optical defect, ranging from refractive errors to complete blindness. In countries where the disease is endemic it is estimated that 75 per cent of all cases of blindness are due to this cause.

The disease is chronic in its course, is difficult of cure, and its contagiousness may persist for years. The best treatment is preventive, and for this reason it is necessary to supplement the work done at

our ports of entry by a survey to detect existing cases in the population, in order to place such cases, wherever found, in proper hygienic surroundings and prevent the spread of the disease to others.

Throughout these investigations only those cases in which there was conjunctival infiltration and thickening associated with so-called granulations and scar tissue formation were classified as trachoma.

Quite a number of cases were encountered in which the conjunctiva was swollen and apparently thickened, in which the granulations were not characteristic, and in which no scar tissue was present. These cases were regarded as suspicious and could not be pronounced trachomatous at the one and only time observed. It would require the application of the therapeutic test to determine their true nature. Doubtless many of the cases regarded as suspicious at the time of this examination will ultimately prove not to be trachoma.

In each instance the examination consisted of an inspection of the conjunctiva exposed by everting the upper eyelids. Advanced cases of trachoma and cases with severe symptoms can easily be recognized by simple inspection. On the other hand, many apparently benign and quiescent cases present no easily recognizable external manifestations and can be detected only by everting the eyelids and exposing the conjunctiva.

From an epidemiological point of view, these are the most important cases, because they are potentially a source of danger, yet are not readily recognized unless looked for in the manner described.

General Results.

Within the past 12 months I have examined within the State of Minnesota 52,847 persons of all classes, including Indians, and found 610 cases of active trachoma—1.14 per cent.

In the white population 77 cases of trachoma were found among 49,305 people, in comparison with 533 cases among 3,542 Indians examined.

Owing to the fact that a separate survey was made by me of the Indian population of Minnesota during October and November, 1912, a separate table showing the result of the preliminary survey during May of the same year is not given in this report, nor is the number of examinations made included in the general results of this survey. The second more detailed survey of the Indian population no doubt included many, if not all, of the Indians seen in the course of the May examination. However, two white children were found on the White Earth Reservation who were suffering from trachoma.

An examination was also made of 49 white men at several lumber camps during this survey, but no trachoma was found among them.

I. Trachoma among the Indians of Minnesota.

This investigation started at Grand Portage, Cook County, Minn. October 7, 1912, and was completed at the Fond du Lac Reservation, Carlton County, Minn., November 15, 1912.

The following reservations and schools were visited: Grand Portage and Grand Marais, Vermilion Lake and Tower Reservation, Red Lake Reservation and schools, Nett Lake Reservation and Pelican Point, Leech Lake Reservation and schools, Cass Lake Boarding School and Winnibigoshish Lake region, Mille Lac nonreservation settlement, and Fond du Lac Reservation.

GENERAL CONSIDERATIONS.

The Indians of Minnesota are of the Chippewa Tribe.

The widely distributed Indian population, the lack of good roads, the element of time, and the season of the year constituted difficulties to be taken into consideration and overcome in making this investigation.

The reservation population of Minnesota is widely scattered, there being but few settlements, and these small and far apart. At every house visited it was necessary to explain the object of and the authority for the examination and, at times, to use persuasion before any examination could be made. In many instances it was necessary to use an interpreter, which was a considerable handicap because of the time consumed in making explanations.

The unusually mild and open autumn, with the incidence of the hunting season, caused many absentees from families visited. Indeed, many houses were found closed, the whole family being absent on a hunting expedition, still further limiting the total number that could be examined within a given time.

Furthermore, Congress having set a time limit for the completion of this investigation, it became necessary to limit the number of Indians examined within a given territory in order to complete the investigation within the designated period. However, every Indian school and reservation within the State was visited and a sufficient number of Indians were examined, at many widely separated points, to form a basis for the calculation of accurate and representative percentages. Over one-third of the Indians of the State were examined.

ORIGIN OF TRACHOMA AMONG THE INDIANS OF MINNESOTA.

The consensus of opinion expressed by older Indians is to the effect that trachoma is a disease of comparatively recent introduction among them. Nowhere in the early literature dealing with the Indian can I find any reference to a prevalence of eye affections among them. The presence of many old cases of the disease, of years' duration, in aged people, in connection with the present prev-

alence and wide distribution of the disease among Indian tribes, would indicate that it has existed among them for several generations.

The majority of the intelligent Indians believe the disease was introduced among the Chippewas by trappers and lumbermen and that it did not exist among them prior to the advent of the white man.

CAUSE OF THE SPREAD OF THE DISEASE AMONG INDIANS.

It may be that the Indian is peculiarly susceptible to the disease. In the course of the general survey of the Indian population referred to, Schereschewsky and others observed a number of cases of trachoma in infants in arms. This is in marked contradistinction to conditions among white people and is suggestive that the subconjunctival lymphoid tissue, the seat of trachomatous infection, is developed earlier in the Indian than in the other races, which is usually about the third year, and may be indicative of an increased susceptibility to the disease.

The principal causes of the spread of trachoma among Indians are their habits, their dwellings, and their indifference to treatment. The average Indian is careless in his personal habits, indifferent to dirt in connection with himself and his surroundings, and lives for the most part in overcrowded, poorly constructed, ill-ventilated houses.

These conditions, in connection with the Indian's known disinclination to continue the prolonged and painful treatment necessary for the cure of trachoma, are most favorable for the spread among them of not only trachoma, but other contagious and infectious diseases.

The Indian is very hospitable and fond of visiting. The social life of the Indian has no doubt played an important part in the spread of the disease, not only from one family to another, but also from tribe to tribe.

PREVALENCE.

Trachoma among the Indians of Minnesota is given special consideration in Tables I to V, inclusive.

TABLE I.—*Trachoma among the Indians of Minnesota.*

Reservation and schools.	Tribe.	Number examined.	Cases of trachoma.	Percentage of trachoma.
Fond du Lac.....	Chippewa.....	182	2	1.09
Grand Portage and Grand Marais.....	do.....	143		
Leech Lake.....	do.....	598	95	15.88
Mille Lacs.....	do.....	178	4	2.24
Nett Lake and Pelican Point.....	do.....	171		
Red Lake.....	do.....	640	117	18.28
White Earth.....	do.....	1,323	272	20.56
Vermilion Lake.....	do.....	120	1	.83
Pipestone ¹	do.....	187	42	22.46
Total.....		3,542	533	15.04

¹ Examined by Preble.

TABLE II.—*Trachoma among reservation Indians, exclusive of school children.*

Reservation.	Number exam- ined.	Cases of trachoma.	Percent- age of trachoma.
Fond du Lac.....	162	2	1.23
Grand Portage and Grand Marais.....	143		
Leech Lake.....	458	63	13.75
Mille Lacs.....	178	4	2.24
Nett Lake.....	145		
Pelican Point.....	26		
Red Lake.....	464	66	14.13
White Earth.....	970	192	19.79
Vermilion Lake.....	36		
Total.....	2,582	327	12.66

Reference to Table I will show 533 cases of trachoma among 3,542 Indians examined, a percentage of 15.04.

No trachoma was found among the Indians in the northeastern section of the State, including Grand Portage, Grand Marais, Tower, and Nett Lake. The only explanation for this is lack of exposure. We are informed that these Indians have but little intercourse with the heavily infected Red Lake and White Earth Indians. The Canadian Northern Railway from this district and the Minnesota International Railway from the Red Lake and other districts converge and meet at International Falls, Minn. Across the Rainy River, at this point, is a Canadian Indian reservation, a common visiting ground for Indians from these two sections, which may, in the future, be the indirect means of spreading the disease among those at present uninfected.

One case of trachoma was found in the Indian boarding school at Tower, but this case was received from another section of the State and was subsequently excluded from the school. The highest percentages of trachoma were found in the White Earth, Red Lake, and Leech Lake Reservations, 20.56, 18.28, and 15.88 per cent, respectively.

The infection on the Red Lake and Leech Lake Reservations is rather uniform, but varies in different parts of the White Earth Reservation. At Pine Point, White Earth Reservation, in a house-to-house canvass, 147 people were examined, with 53 cases of trachoma among them, a percentage of 36.05. These Indians are greatly addicted to drink, are in abject poverty, and their homes and surroundings are the most squalid imaginable.

At the Fond du Lac Reservation the percentage of trachoma to the total examined was only 1.24. These Indians are in rather close contact with civilization, are fairly well housed, and have some reserve food supply.

TABLE III.—*Trachoma in Indian boarding schools.*

Name of school.	Pupils examined.	Cases of trachoma.	Percentage of trachoma.
Cass Lake.....	47	18	38.29
Cross Lake.....	46	12	26.08
Leech Lake.....	64	12	18.75
Pipe Stone.....	187	42	22.46
Red Lake.....	63	19	30.15
St. Benedict's Industrial.....	94	12	12.75
St. Mary's Mission, Red Lake.....	64	20	31.25
Vermilion Lake.....	84	1	1.11
White Earth.....	130	42	32.30
Wild Rice River.....	54	15	27.77
Total.....	833	193	23.16

TABLE IV.—*Trachoma in Indian day schools.*

School.	Number of pupils.	Cases of trachoma.	Percentage of trachoma.
Fond du Lac.....	20	0	0.00
Portersville, White Earth.....	29	1	3.44
Squaw Point, Leech Lake.....	17	0	0.00
Sugar Point, Leech Lake.....	12	2	16.66
White Earth.....	46	10	21.73
Total.....	124	13	10.48

A comparison of Tables I to IV will show that the highest percentage of trachoma, 23.16, is found in the Indian boarding schools. The percentage among reservation Indians, exclusive of boarding-school children, and in the day schools is 12.66 and 10.48, respectively.

The enormously greater prevalence of trachoma among boarding-school children indicates strongly that the intimate daily contact of school life is a potent factor in the spread of the disease among the pupils.

The return of infected pupils to reservation life at the close of the school term may cause a further and more rapid spread of the disease in the general Indian population than would otherwise have been the case and carry the disease into uninfected territory.

INJURY TO VISION CAUSED BY TRACHOMA.

Grave visual defects are usually late effects of trachoma; therefore Table V may be considered as a presage of future visual damage. Most of the cases of trachoma enumerated in this survey are of comparatively recent origin, and in young subjects who may yet become blind as a late effect of trachoma.

Proportionately, the greatest number of cases of trachoma were found among Indian school children, among whom we would scarcely expect to find marked visual damage by reason of the comparatively short time they have had the disease. For this reason Table V was calculated on the basis of reservation Indians, exclusive of boarding school children, among whom most of the visual defects were observed.

TABLE V.—*Injury to vision among reservation Indians caused by trachoma.*

Number examined.....	2,582
Cases of trachoma.....	327
Number with marked injury to vision.....	41
Number blind from trachoma.....	19
Percentage of marked visual damage in trachoma cases.....	18.04
Percentage of visual damage total examined.....	2.32
Percentage of blind from trachoma to total examined.....	.73

The greatest numbers of cases with serious damage to vision were encountered on the reservations most heavily infected with trachoma, and therefore presumably infected for the longest time. In these reservations trachoma has undoubtedly existed for generations and found conditions favorable for its spread and perpetuation, with consequent severity of its manifestations.

These figures do not take into consideration minor damage and refractive errors, invariable accompaniments of trachoma, which at the same time exert a powerful deterrent influence on the comfort and well-being of one so afflicted.

ECONOMIC LOSS TO THE STATE.

It will require prompt and drastic treatment to prevent the further spread of trachoma among the Indian population and to preserve vision to many of those who otherwise are doomed to blindness.

Many of the Indians are already citizens of the State and exercise the right of the franchise. In time all the Indian land will be allotted and the Federal Government will gradually relinquish its guardianship. The State is therefore threatened with a heritage of disease and blindness, which will be a dead economic loss and which will heavily tax the resources of communities wherein these people may reside.

BEARING OF THE PREVALENCE OF TRACHOMA AMONG THE INDIANS ON THE HEALTH OF THE STATE.

Indian reservations are no longer remote from centers of white population. The tide of settlement has reached their confines and overflowed their borders. Many white settlers have bought Indian lands and settled among them. Two of the largest reservations within the State are traversed by railroads. A county has been organized within the boundaries of one reservation, and children of both races attend the public schools.

The Indian is fond of travel and makes frequent trips by rail, increasing the danger of the spread of trachoma virus to the traveling public.

Many Indians are employed in and about lumber camps during the logging season. A number of Indian "shacks" are always to be found on the outskirts of lumber camps operating in the vicinity of reservations. A lumber jack, infected at this source, may spread the disease when the logging season is ended and he leaves, as is his custom, to engage in farming and other pursuits in this and other States.

II. Survey of public schools in vicinity of reservations.

An examination of public-school children at points contiguous to Indian reservations disclosed 77 children of mixed blood among a total of 1,428 examined. Three cases of trachoma, or 3.8 per cent, were found among these 77 children of mixed blood, and no cases among the remaining 1,351 white pupils. On the other hand, 2 cases suspicious of trachoma were found among white pupils and 4 cases among the mixed-blood children. It is a reasonable presumption that the mixed-blood school population is the source of infection in these cases, should they prove to be trachoma.

TABLE VI.

Place.	School.	Examined.		Cases of trachoma found.		Suspicious cases.	
		White.	Mixed blood.	White.	Mixed blood.	White.	Mixed blood.
Becker County.....	District No. 38.....	38	1	.....	1	.....	.....
Park Rapids.....	Central.....	365	3	.....	.....	.....	.....
Do.....	East Side.....	73	.....	.....	.....	.....	.....
Mahnomen County.....	Districts No. 3 and No. 1....	7	3	.....	.....	.....	.....
Do.....	do.....	87	28	.....	1	1	.....
Do.....	District No. 2.....	5	4	.....	.....	.....	.....
Waukon.....	.....	34	12	.....	.....	.....	.....
Detroit.....	High school and Washing- ton School.	580	23	.....	1	1	4
Walker.....	.....	162	3	.....	.....	.....	.....
		1,351	77	.....	3	2	4
Miscellaneous (teachers, janitors, etc.).....	.....	58	.....	.....	.....	.....	.....
Mixed-blood family.....	.....	.....	5	.....	.....	.....	.....
Scattering.....	.....	3	.....	.....	.....	.....	.....
		61	5	.....	.....	.....	.....

Percentage of trachoma among mixed-blood pupils, 0.038.

This examination shows that children of mixed parentage are attending the public schools in appreciable numbers. It is reasonable to suppose as time goes by this number will be greatly increased. The existence of trachoma, among a few even of these children, is a possible source from which trachoma may spread to the surrounding white population, and is a danger to be guarded against.

III. Trachoma on the Mesaba and Vermilion Iron Ranges, St. Louis and Itasca Counties.

A total of 1,711 miners were examined and 34 cases of trachoma found, 1.99 per cent.

At Ely, on the Vermilion Range, 392 miners were examined, and no trachoma was found among them. Therefore the 34 cases of trachoma were confined to the 1,319 miners of the Mesaba Range, a percentage of 2.57.

A significant fact is the finding of cases of active trachoma at each of the eight mining locations visited on the Mesaba Range.

The difference with respect to the trachoma situation on the two ranges is due to a difference in the social conditions of the miners of the two regions. The miners of the Vermilion Range are mostly Finns, who are married and live in their own homes. These men have remained and worked in this one location for years.

TABLE VII.—*Trachoma among miners of the Mesaba and Vermilion iron ranges.*

Location.	Number examined.	Trachoma.		Percentage of trachoma.
		Positive.	Suspected.	
Biwabik.....	73	3	1	4.10
Bovey.....	66	4	.....	6.06
Chisholm.....	1	1	.....	.....
Coleraine.....	93	3	2	2.15
Ely.....	392	.....	.....	.....
Gilbert.....	1	1	.....	.....
Hibbing.....	710	8	4	1.12
Marble.....	65	7	.....	10.76
Virginia.....	310	7	4	2.25
Total.....	1,711	34	11	1.99

The miners of the Mesaba Range are from southeastern Europe. The majority of them are single and live in crowded boarding houses. They frequently move from one location to another and have no fixed abode, so that one case of trachoma may infect not only one boarding house or camp but also other camps in other locations as he moves from place to place.

In the past miners have brought suit against the companies, claiming that they have contracted trachoma by getting dirt into the eyes while at labor. It has been the practice of the mining companies to discharge, therefore, all miners found to be afflicted with the disease. This practice has contributed not a little to the spread of trachoma among them, because, when discharged, the miner simply and conveniently changes his name and moves to another location, where he acts as a focus of infection in another family or boarding house.

The cases of trachoma seen among these miners were active, some of them in the acute stage of the disease. The presence of such numbers of comparatively recent cases of trachoma at so many different

locations points to foci of infection among them from which the disease is spreading, rather than that the number of diseased is augmented by fresh importations.

INVESTIGATION OF TRACHOMA IN PUBLIC SCHOOLS OF MESABA IRON RANGE.

TABLE VIII.

School district.	Number of pupils examined.	Cases of trachoma.	
		Positive.	Suspicious.
Biwabik.....	465	3	.....
Bovey.....	143	.....	.....
Chisholm.....	1,064	2	1
Coleraine.....	205	.....	.....
Eveleth.....	1,315	.....	.....
Gilbert.....	573	.....	.....
Hibbing.....	1,168	2	2
Marble.....	130	.....	.....
Taconite.....	71	.....	.....
Virginia.....	1,747	3	1
Total.....	6,881	10	4
Miscellaneous:			
Bovey.....	2	2	.....
Ely.....	2	2	.....
Total.....	6,885	14	4

¹ 0.001 per cent.

Trachoma has gained entry to the public schools in 4 of the 10 districts examined. Without exception the disease was found in children of foreign parentage. In one instance a case of trachoma was traced to a family in which two miners boarded, both of them having trachoma.

BEARING OF TRACHOMA AMONG MINERS ON THE HEALTH OF THE STATE.

The percentage of trachoma; 2.57, among the miners of the Mesaba Range is second to that among the Indians, 15.04 per cent. The Indian is a future contingency; the miner is a present problem. The Indian has but little direct association with the white population of the State; the miner is a part of the white population, and his children attend the public schools in preponderating numbers in certain locations. An increase of trachoma among the miners will be reflected by an increase of the disease in the school population and a wider spread in the general mining population.

Other mining locations are being opened up. Diseased miners going into these locations will carry trachoma to communities never before infected.

In this connection it is unfortunate that a strike by the miners of the newly opened Cuyuna Range prevented an inspection of the miners of that region. However, local physicians report trachoma to be prevalent among them.

IV. Trachoma in Schools and State Institutions.

In Tables IX and X is given a résumé of a survey of various public, parochial, and normal schools and other institutions made March 6 and April 19, 1913.

In the course of this survey 18 counties were visited and 39,164 inspections were made. The examinations were confined to school children and the inmates of State institutions, for the reason that any great prevalence of trachoma in a community would certainly manifest itself in the school population, and that the State institutions would furnish representatives from many and widely separated sections of the State.

TABLE IX.

County.	City, village, or township.	Schools and institutions.	Number examined.	Trachoma cases.		
				Positive.	Suspected.	Recovered.
Beltrami.....	Bemidji.....	3 public.....	880	1	1	.....
Do.....	Nymore.....	1 public.....	143	.....	1	.....
Blue Earth.....	Mankato.....	6 public, 1 normal.....	1,870	.....	5	.....
Carlton.....	Cloquet.....	4 public.....	1,097	.....	1	.....
Do.....	do.....	1 parochial.....	306	1	.....	.....
Clay.....	Moorhead.....	6 public, 1 normal.....	1,197	.....	.....	.....
Do.....	do.....	1 parochial.....	127	.....	.....	.....
Crow Wing.....	Brainard ¹	6 public.....	1,552	4	.....	.....
Dakota.....	South St. Paul.....	4 public.....	977	3	3	.....
Goodhue.....	Red Wing.....	2 public.....	754	.....	.....	.....
Do.....	do.....	State training.....	160	.....	.....	.....
Hennepin.....	Minneapolis.....	20 public.....	10,251	2	3	2
Do.....	do.....	6 parochial.....	1,554	1	2	.....
Itasca.....	Grand Rapids.....	3 public.....	530	.....	.....	.....
Otter Tail.....	Fergus Falls.....	5 public.....	1,094	.....	.....	.....
Polk.....	Crookston.....	6 public.....	1,096	.....	.....	.....
Ramsey.....	Rose Township.....	Agricultural.....	430	.....	.....	.....
Rice.....	Faribault.....	Blind.....	84	.....	1	3
Do.....	do.....	Deaf.....	244	.....	.....	.....
Do.....	do.....	Feeble-minded.....	1,425	10	1	7
St. Louis.....	Duluth.....	19 public and normal.....	7,618	.....	4	.....
Stearns.....	St. Cloud.....	6 public and normal.....	1,374	.....	.....	.....
Do.....	do.....	State reformatory.....	468	.....	.....	1
Steele.....	Owatonna.....	State public.....	255	.....	.....	.....
Washington.....	Stillwater.....	State prison.....	869	2	.....	5
Winona.....	Winona.....	6 public and normal.....	1,603	.....	.....	.....
Do.....	do.....	5 parochial.....	1,306	.....	.....	.....
Total.....	.....	.....	39,164	24	22	18

¹ Three in family of an uninfected girl attending school.

Only 24 cases of active trachoma were found. Ten of these cases were in one institution, the school for feeble-minded children. Two other cases were found in the State prison and three more in a family residing in Brainard, making a total of 15 cases out of 24 that can not be classified as occurring among school children. Furthermore, 3 of the remaining 9 cases of trachoma were among members of the same family.

The existence of 10 cases of active trachoma, 1 suspicious case, and 7 old recovered cases among the inmates of the school for feeble-minded would indicate the disease has existed in this institution for several years and that some of the 10 cases contracted the disease subsequent to their admission to the school.

An examination, therefore, of 35,229 pupils of the public and parochial schools disclosed only 9 cases of trachoma and those were confined to 6 out of the 18 counties visited. The assumption is clear that trachoma is present but not alarmingly prevalent in the general white population of the State with the exception of the mining region.

TABLE X.

MINNESOTA TRACHOMA SURVEY.

United States Public Health Service Cooperating with Minnesota State Board of Health.

County representation in State institutions inspected for trachoma in March-April, 1913, by Tullioferro Clark, surgeon, United States Public Health Service.

PART I.

[No cases were found in these institutions.]

Counties.	Normal schools.					Special schools.			Total for each county.
	Man- kato.	Winona.	Duluth.	St. Cloud.	Moor- head.	For deaf, Faribault.	State public, Owa- tonna.	Training (boys), Red Wing.	Depart- ment of agricul- ture, Uni- versity of Minne- sota. ¹
Aitkin.....			3	2		2			7
Anoka.....		2	1	4			3	1	11
Becker.....					36	2	3	2	43
Beltrami.....			4		3	5	3	2	20
Benton.....				49		3		1	53
Big Stone.....				5	14		3		22
Blue Earth.....	291			2		1	10	1	305
Brown.....	33			1	1	1		1	36
Carlton.....	2		29		2	1	3	2	40
Cass.....	5			3		1			9
Carver.....		2	2	3		3		2	19
Chippewa.....	1	3		1					8
Chicago.....			5	14				1	24
Clay.....	1			1	141	4	3		150
Clearwater.....					1	1			3
Cook.....		1	2						3
Cottonwood.....	19	2						1	23
Crow Wing.....			9	6	1	2	1	2	22
Dakota.....	9			1		2			16
Dodge.....	6	11				4			22
Douglas.....				9	9	5	9	1	33
Faribault.....	33	3				4	2		44
Fillmore.....	5	43				7		1	50

Freeborn.....	6	8				1	4		20
Goodhue.....	11	20				3			36
Grant.....	2	1	2	7		1			35
Hennepin.....	14	53	3	48		1	64	75	297
Houston.....	1	9	1	1		39			12
Hubbard.....	1	1	2	1					7
Isanti.....	1	1	1	6			4	5	16
Itasca.....			12	1			8		21
Jackson.....	7	2				1	2	1	13
Kanabec.....				2			2	1	5
Kandiyohti.....				21		3	2	1	24
Kittson.....				5	20				
Koochiching.....			3	4					
Lac qui Parle.....	4		1	1					
Lake.....			5				5		11
Le Sueur.....	53	2	1	1		3	1		59
Lincoln.....	14	5	1			1	2		19
Lyon.....	25	3	3	5		2	2		38
McLeod.....	3	3	2			2	2	1	14
Mahnomen.....					5				2
Marshall.....	14	1	1			2			18
Martin.....		4				2	2		22
Meeker.....			1	9	6				10
Millie Lacs.....				5		2			33
Morrison.....	10	5		24	3	3	1	3	20
Mower.....	19	3				2			23
Murray.....	46	1		1		1	3	1	63
Nicollet.....	12	1				2		2	17
Nobles.....			2			5			80
Norman.....		10			73				292
Onsted.....	8		2	7	1	1	2		153
Otter Tail.....	1			1	134	7	1	2	19
Pennington.....					18				24
Pine.....	1	1	13	5		1	2	1	14
Plymouth.....	7	2	5	2		11	6		78
Polk.....			5	16	3				20
Pope.....	3	11	2	6	2	31	51	65	171
Ramsey.....					2				11
Red Lake.....	27	1	1		6	2		1	35
Redwood.....	7	5	1		3	3			24
Renville.....	21	1	2	5	1	5	5		36
Rice.....				2					3
Rock.....	1	1							4
Roseau.....						1			3
St. Louis.....		12	181	12	2	24	78	37	346
Scott.....	16	3						2	21
Sherburne.....				41					41
Sibley.....	8	1				3			16
Stearns.....	4	1	1	156		6	1	6	175
Steele.....	18	7				4	1		30
Stevens.....	1	1		13		3			22

¹ Distribution by counties could not be obtained for the 430 examined.

Big Stone.....	5	3	.....	3	.....	3	.....	22	30
Blue Earth.....	31	19	.....	8	.....	3	.....	305	358
Brown.....	15	8	.....	7	.....	.....	.....	36	59
Carlton.....	5	7	.....	3	.....	.....	.....	40	23
Carver.....	11	10	.....	1	.....	.....	.....	14	9
Cass.....	11	10	.....	1	.....	.....	.....	19	41
Chippewa.....	6	5	.....	1	.....	.....	.....	7	15
Chisago.....	6	5	.....	1	.....	.....	.....	12	24
Clay.....	8	19	.....	4	.....	.....	.....	31	36
Clearwater.....	4	3	.....	3	.....	.....	.....	150	181
Cook.....	.....	5	.....	.....	.....	.....	.....	2	9
Cottonwood.....	8	5	.....	2	.....	.....	.....	5	8
Crow Wing.....	12	5	.....	4	.....	.....	.....	23	38
Dakota.....	13	7	.....	6	.....	.....	.....	22	23
Dodge.....	9	3	.....	1	.....	.....	.....	16	44
Douglas.....	16	3	.....	.....	.....	.....	.....	22	35
Faribault.....	16	5	.....	.....	.....	.....	.....	33	54
Fillmore.....	8	2	.....	.....	.....	.....	.....	10	44
Freeborn.....	12	1	.....	2	.....	.....	.....	15	71
Goodhue.....	13	6	.....	3	.....	.....	.....	20	42
Grant.....	31	10	.....	5	.....	.....	.....	36	82
Hennepin.....	4	3	.....	.....	.....	.....	.....	35	42
Houston.....	254	219	.....	66	.....	.....	.....	297	836
Hubbard.....	10	3	.....	.....	.....	.....	.....	12	25
Jacobi.....	8	1	.....	2	.....	.....	.....	7	16
Jackson.....	8	.....	.....	.....	.....	.....	.....	9	25
Kanabec.....	4	25	.....	1	.....	.....	.....	21	55
Kandiyohi.....	1	5	.....	1	.....	.....	.....	13	23
Kenosha.....	13	2	.....	2	.....	.....	.....	5	10
Kittling.....	7	4	.....	.....	.....	.....	.....	14	24
Le Sueur.....	17	10	.....	9	.....	.....	.....	27	38
Lake.....	11	2	.....	.....	.....	.....	.....	8	37
Lake Park.....	3	2	.....	1	.....	.....	.....	7	19
Le Sueur.....	21	8	.....	1	.....	.....	.....	11	17
Lincoln.....	9	1	.....	.....	.....	.....	.....	59	88
Lyon.....	9	6	.....	.....	.....	.....	.....	19	43
McLeod.....	14	3	.....	.....	.....	.....	.....	14	31
Mahtomen.....	1	1	.....	.....	.....	.....	.....	2	4
Marshall.....	15	1	.....	2	.....	.....	.....	8	31
Meeker.....	9	6	.....	.....	.....	.....	.....	16	34
Martin.....	14	4	.....	.....	.....	.....	.....	10	22
Miller.....	4	.....	.....	.....	.....	.....	.....	12	41
Mill Lake.....	8	7	.....	2	.....	.....	.....	16	46
Morrison.....	11	14	.....	2	.....	.....	.....	30	49
Mower.....	4	4	.....	1	.....	.....	.....	17	37
Murray.....	9	5	.....	1	.....	.....	.....	23	53
Nicollet.....	13	7	.....	2	.....	.....	.....	15	32
Nobles.....	8	1	.....	.....	.....	.....	.....	22	17
Norman.....	16	17	.....	.....	.....	.....	.....	9	30
Olmsted.....	45	.....	.....	.....	.....	.....	.....	16	80
Other Tail.....	.....	17	.....	2	.....	.....	.....	22	38
	.....	.....	.....	.....	.....	.....	.....	153	217

¹ Distribution by counties could not be obtained for the 84 examined.

County representation in State institutions inspected for trachoma in March-April, 1913, by *Taliaferro Clark, surgeon, United States Public Health Service*—Continued.

PART II—Continued.

Counties.	Feeble-minded Furnish. + old? 10 7 1	Prison, Still- water. + old? 2 5 0	Reformatory, St. Cloud. + old? 0 1 0	School for blind, Fort- + old? 0 3 1	Total for each county.	Part I, total for each county.	Sum total, Parts I and II, represen- tation by counties.
Pennington.....	10	4	4		18	19	19
Pine.....	3	3			6	24	42
Pipestone.....	18	37			47	14	20
Polk.....	8	7	2		15	178	125
Pope.....	20	106			358	20	35
Ramsey.....	7	4	47		17	171	529
Red Lake.....	13	3			11	22	33
Redwood.....	16	3	1		17	35	42
Renville.....	27	6	3		36	24	44
Rice.....	3	2	1		6	58	72
Rock.....	4	2			6	9	10
Roseau.....	49	129			218	4	10
St. Louis.....	20	4	40		24	346	564
Shoart.....	6	6			13	21	45
Sibley.....	3	2	1		6	41	54
Stearns.....	42	10	4		56	16	22
Steele.....	9	1	2		12	175	231
Stevens.....	10	3			13	30	42
Swift.....	11	2			13	22	35
Todd.....	17	7			24	18	31
Traverse.....	3	2			5	30	54
Wabasha.....	19	2			21	8	13
Wadena.....	6	5	1		12	45	66
Waseca.....	12		1		13	15	27
Washington.....	16	12			28	33	46
Watsonwan.....	9		1		10	19	47
Wilkin.....	8	3			11	39	49
Winona.....	19	12	3		34	21	32
Wright.....	24	11			35	16	50
Yellow Medicine.....	15	1			16	42	77
						33	49

A very important fact from an epidemiological viewpoint is that not one of the cases of trachoma discovered in the course of this survey was known to be existing. These few cases, therefore, emphasize the necessity of a periodic inspection of schools and institutions for the detection of existing cases of the disease, so that measures may be instituted to prevent its spread to others.

In the school for the blind 3 old "played-out" cases of trachoma were found among the 84 pupils. Trachoma was the cause of blindness in at least 1 of these pupils and, very possibly, of the other 2 also.

Two cases of active trachoma were found in the State prison, and both cases were in the persons of former residents of St. Louis County, the great mining county of the State, where a considerable number of trachoma cases were found in the mining population.

Sporadic cases of trachoma have occurred in the general population of the State for years, as is evidenced by the cases of recovered trachoma found during this survey. No alarming prevalence of the disease among the general population of the State outside of the Indians and mining population has been found during this survey. A sufficient number of cases, however, have been discovered to serve as a warning to the proper authorities to be on the lookout for the disease even in the least suspected localities.

TRACHOMA AND NATIONALITY.

From Table XI, showing parentage of foreign-born whites in connection with these trachoma examinations, and Table XII, showing the number of pupils of alien birth or parentage in the schools of Minneapolis, South St. Paul, and Winona, it may be seen that the parentage of foreign born and of native born of foreign or mixed parentage is very high in the counties where these examinations were made. This fact, taken in connection with the low percentage of trachoma found in this general population, leads to the inevitable conclusion that the examination for trachoma at ports of entry is very thorough and that any relaxation of present restrictions in this respect would result most disastrously to the health of a State with a cosmopolitan population, as is the case in Minnesota.

TABLE XI.—*Foreign nationalities resident in Minnesota counties where trachoma examinations were made.*

[Population statistics taken from the United States census, 1910.]

County.	Population, 1910.	Native whites, foreign or mixed parent- age.	Per cent of popu- lation, 1910.	For- eign- born whites.	Per cent of popu- lation, 1910.	Total num- ber exam- ined in county.	Number trachoma cases found.
Becker.....	18,840	8,443	44.8	4,335	23.0	690	+ <i>Old.</i> 7
Beltrami.....	19,337	7,015	36.3	5,237	27.1	1,023	0 0 5
Blue Earth.....	29,337	12,754	43.5	5,348	18.2	1,870	0 0 5
Carlton.....	17,559	7,858	44.8	6,620	37.7	1,403	1 0 1
Cass.....	11,620	3,316	28.5	2,548	21.9	181	2 0 0
Clay.....	19,640	10,201	51.9	5,375	27.4	1,324	0 0 0
Crow Wing.....	16,861	6,900	40.9	4,095	24.3	1,552	4 0 0
Dakota.....	25,171	10,954	43.5	6,236	24.8	977	3 0 3
Goodhue.....	31,637	15,632	49.4	7,486	23.7	914	0 0 0
Hennepin.....	333,480	129,473	38.8	92,835	27.8	11,805	3 2 5
Hubbard.....	9,831	3,153	32.1	1,785	18.2	439	1 0 0
Itasca.....	17,208	5,746	33.4	6,958	40.4	3,183	16 0 2
Mahnomen.....	3,249	769	23.7	298	9.2	135	2 0 0
Ottertail.....	46,036	23,638	51.3	12,554	27.3	1,094	0 0 0
Polk.....	36,001	19,826	55.1	10,594	29.4	1,096	0 0 0
Ramsey.....	223,675	97,800	43.7	58,619	26.2	430	0 0 0
Rice.....	25,911	12,131	46.8	4,636	17.9	1,753	10 10 2
St. Louis.....	163,274	62,337	38.2	75,480	46.2	13,561	32 0 17
Stearns.....	47,733	23,505	49.2	8,749	18.3	1,842	0 1 0
Steele.....	16,146	7,880	48.8	3,351	20.8	255	0 0 0
Washington.....	26,013	12,807	49.2	6,531	25.1	869	2 5 0
Winona.....	33,398	16,159	48.4	6,519	19.5	2,909	0 0 0
Total.....						49,305	77 18 42
Indians examined in October, 1912 (see S. Doc. No. 1038).....						3,542	533 (1) (1)

¹ Among Indians only active cases were recorded.

Dr. Clark examined in May, 1912, at White Earth, Cass Lake, and Vermilion Lake Reservations, 659 Indians, finding 183 active and 11 suspicious cases of trachoma. These are not counted in above because some undoubtedly were reexamined in October, 1912.

TABLE XII.—*Number of foreign-born pupils, or pupils whose parents were foreign born, examined in schools.*

Nationalities.	Minneapolis.		Winona, 4 paro- chial; cases found: None.	South St. Paul, 4 pub- lic; cases found: + old ? 3 0 3	Total.
	16 public; cases found: + old ? 2 2 3	5 parochial; cases found: + old ? 1 0 2			
Africans.....	68	.....	.....	.....	68
Austrians.....	193	.....	1 46	25	264
Canada:					
French.....	5	.....	.....	3	8
Other.....	19	.....	.....	2	21
Chinese.....	6 (1?)	.....	.....	.....	6
Dutch.....	5	.....	.....	.....	5
English.....	193	.....	.....	9	202
Finnish.....	99	.....	.....	.....	99
French.....	262	246	.....	2	510
Germans.....	952 (2?)	284	154	95	1,485
Greeks.....	4	.....	.....	.....	4
Hungarians.....	18	.....	.....	6 (3+; 3?)	24
Irish.....	519	280	.....	12	811
Italians.....	72	.....	.....	.....	72
Roumanians.....	20	.....	.....	1	21
Russians.....	800	2 626 (2?)	2 982	31	2,439
Scotch.....	60	.....	.....	4	64
Swiss.....	6	.....	.....	.....	6
Welsh.....	3	.....	.....	.....	3
Jews.....	1,027	.....	.....	.....	1,027
Scandinavians.....	2,350 (2+; 2?)	.....	.....	83	2,433
	6,681	1,436	1,182	273	9,572

¹ Bohemians.² Polish.³ All in one family.

NOTE.—Nationalities could not be obtained for pupils of one Minneapolis and one South St. Paul school. In the Duluth schools (18 public and 1 normal) only 4 suspicious cases were found among 7,618 persons argely of alien birth or parentage.

Conclusions.

(1) Trachoma is extremely prevalent among the Indians of Minnesota, and the highest prevalence among them is found in the Indian boarding schools.

(2) The Indians in the northeastern section of the State, including Grand Portage, Grand Marais, Vermilion Lake, and Nett Lake, are free from trachoma.

(3) There is a possibility that the Indians of the northeastern section of the State may become infected through association with infected districts with improvement in facilities for intercommunication.

(4) The habits and social customs of the Indians favor the spread of trachoma among them.

(5) The Indian boarding schools have doubtless played an important part in the spread of trachoma among the Indians of the State.

(6) The heavily infected Indian reservations of Minnesota are a threatening source of danger to the public health of the State.

(7) The Indian is coming into closer contact with the white population with increasing opportunity for the spread of trachoma through improvements in lines of communication, the purchase and settlement of allotted Indian lands by white settlers, and the organization of counties within the boundaries of Indian reservations.

(8) Children of mixed parentage are attending the public schools contiguous to reservations in considerable numbers. Trachoma has been found among these children of mixed parentage, and they are a possible means by which the disease may spread from the Indian to the white population.

(9) The Federal Government will sooner or later relinquish its guardianship of the Indian; therefore conditions of health reducing his future economic usefulness is a matter of present concern to the State authorities.

(10) Trachoma is dangerously prevalent among the miners of the Mesaba iron range.

(11) More trachoma is found in the public schools of the Mesaba Range than among the white pupils of the public schools contiguous to Indian reservations; there is therefore greater danger of the disease spreading from this source at present than from the Indian reservations.

(12) The trachoma situation in the mining region of the State is a pressing public health problem demanding immediate solution.

(13) Nearly all the cases of trachoma found among miners were of recent origin, which indicates the existence of widely scattered foci of infection in the mining region rather than recent importation of cases.

(14) Trachoma is not prevalent to an alarming degree in the State of Minnesota outside of Indian reservations and the mining regions.

Recommendations.

The control of trachoma in Minnesota is complicated by the Federal guardianship of the most heavily infected portion of the State population, namely, that of the Indian reservations.

A report transmitted to Congress January 27, 1913, by the Public Health Service, of investigations made in accordance with an act of Congress approved August 24, 1912, into the prevalence of contagious and infectious diseases among the Indians of the United States, contains general and specific recommendations for the control of trachoma in the Indian population of the United States. The survey of the Indian population herein set forth is a component part of this report and the recommendations contained therein are pertinent to the trachoma situation in the State and are as follows:

(1) Hospital facilities should be provided on reservations for the reception of Indians suffering from severe trachoma and in need of hospital treatment. Sufficient authority should be granted to require them to undergo such treatment when, from the condition of their eyes, they are a menace to the public health. Hospitals for this purpose need not be expensive, and most trachoma cases could receive out-patient treatment.

(2) In each infected sanitary district of a reservation a dispensary or office, portable or permanent in character, should be provided for the treatment of cases of trachoma not requiring hospital care, and such dispensaries should be in charge of those qualified to administer treatment for diseases of the eyes.

(3) A sufficient number of field nurses should be provided to administer, under the direction of the physician, home treatment and instruction to those who can not be sent to the hospital nor attend the dispensary.

(4) The present regulation of the Office of Indian Affairs relating to the physical welfare and sanitary supervision of school children should be strictly enforced and report thereon made regularly.

(5) All Indian schools, day and boarding, both Federal and mission, should at all times be under competent medical and sanitary supervision.

(6) No children suffering from trachoma should be admitted to uninfected schools.

(7) Separate schools, where practicable, should be established for trachomatous children.

(8) Whenever it is impracticable to establish such separate schools, trachomatous children in boarding schools should be strictly segregated from healthy pupils. Separate dormitories, class rooms, dining rooms, and playgrounds should be assigned for their exclusive use.

(9) All boarding schools wherein trachomatous pupils are admitted should be provided with adequate facilities for the care and treat-

ment of trachoma, such facilities to include the permanent services of a nurse trained in the care and treatment of diseases of the eye.

(10) Systematic medical examinations should be made regularly of all children in schools. This provision is contained in an existing regulation governing schools.

It is also recommended that "Whenever necessary and practicable cooperation should be had with State boards of health in putting these recommendations into effect."

The following recommendations are made for the control of trachoma in the white population:

(1) Trachoma should be declared a notifiable disease and every case notified should be investigated by local health officials to enforce State regulations relating to the control of trachoma.

(2) Trachoma should be declared conditionally quarantinable and sufficient funds provided in order that cases of trachoma which are not or can not be treated at home, in accordance with the regulations of the State board of health governing this disease, may be apprehended and treated at the expense of the State.

(3) All cases of active trachoma should be excluded from the public schools.

(4) A detailed examination of public-school children should be made at least once each year by school physicians, or local health officers where there is no school physician, for the detection of possible cases of trachoma.

(5) All cases of conjunctivitis should be excluded from school until such condition is recovered from.

(6) Wherever practicable, school nurses should be employed whose duty it shall be to visit the houses of trachomatous children excluded from school on that account, to administer treatment under a physician's direction, and to instruct the parents in the rules of hygiene governing this disease.

(7) Trachomatous children whose parents are unable to provide medical treatment should be treated at expense of the State.

(8) The cooperation of all the mining companies of the State should be secured in the making of a detailed examination of the mining population for the detection of all the cases of trachoma among the miners employed by them.

(9) Miners suffering from trachoma should not be allowed to drift from one location to another unregulated and unrestricted.

(10) All miners suffering from trachoma should be compelled to undergo treatment under such restrictions as may insure safety to others. If necessary, this treatment should be at the State's expense, and be made mandatory.

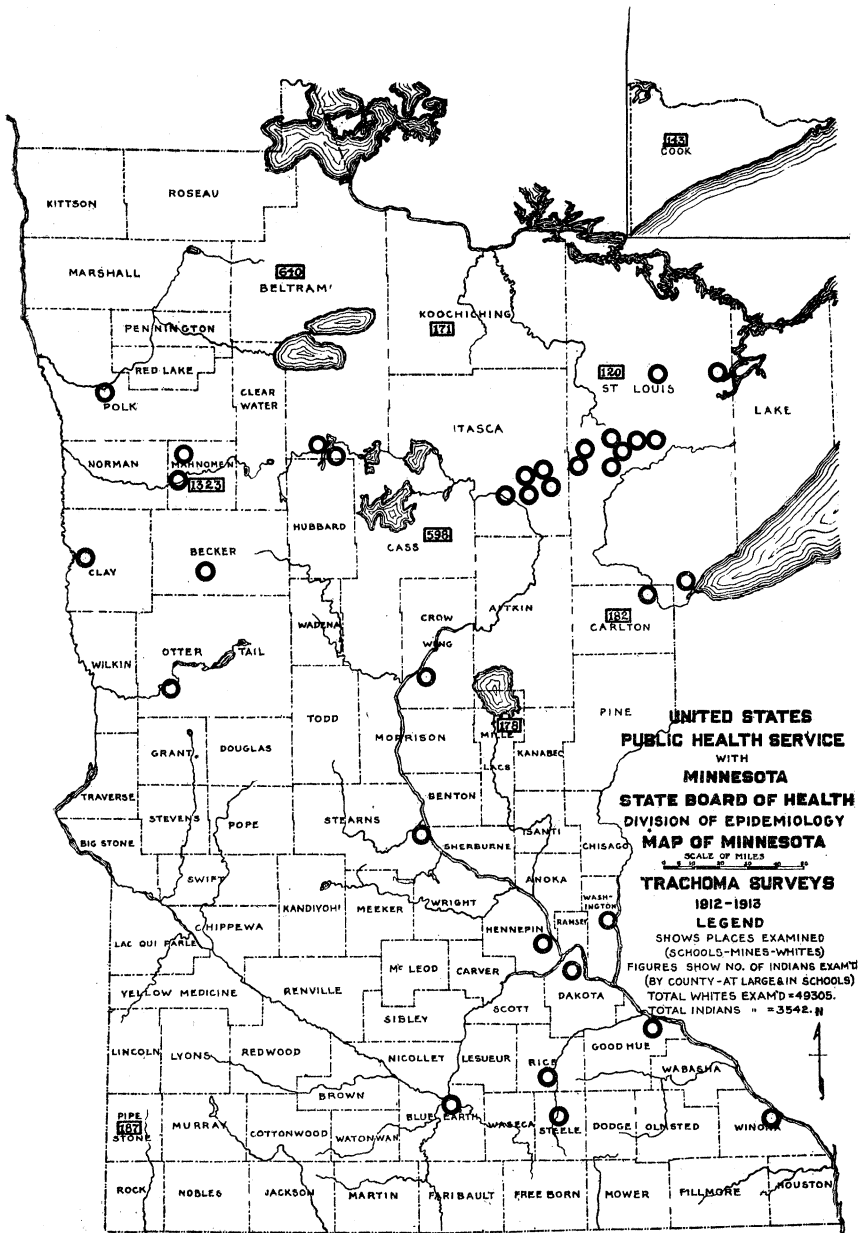
(11) All miners' boarding houses and boarding shacks should be regularly inspected and rules and regulations prescribed and enforced to prevent the spread of trachoma among the men dwelling therein.

Acknowledgments.

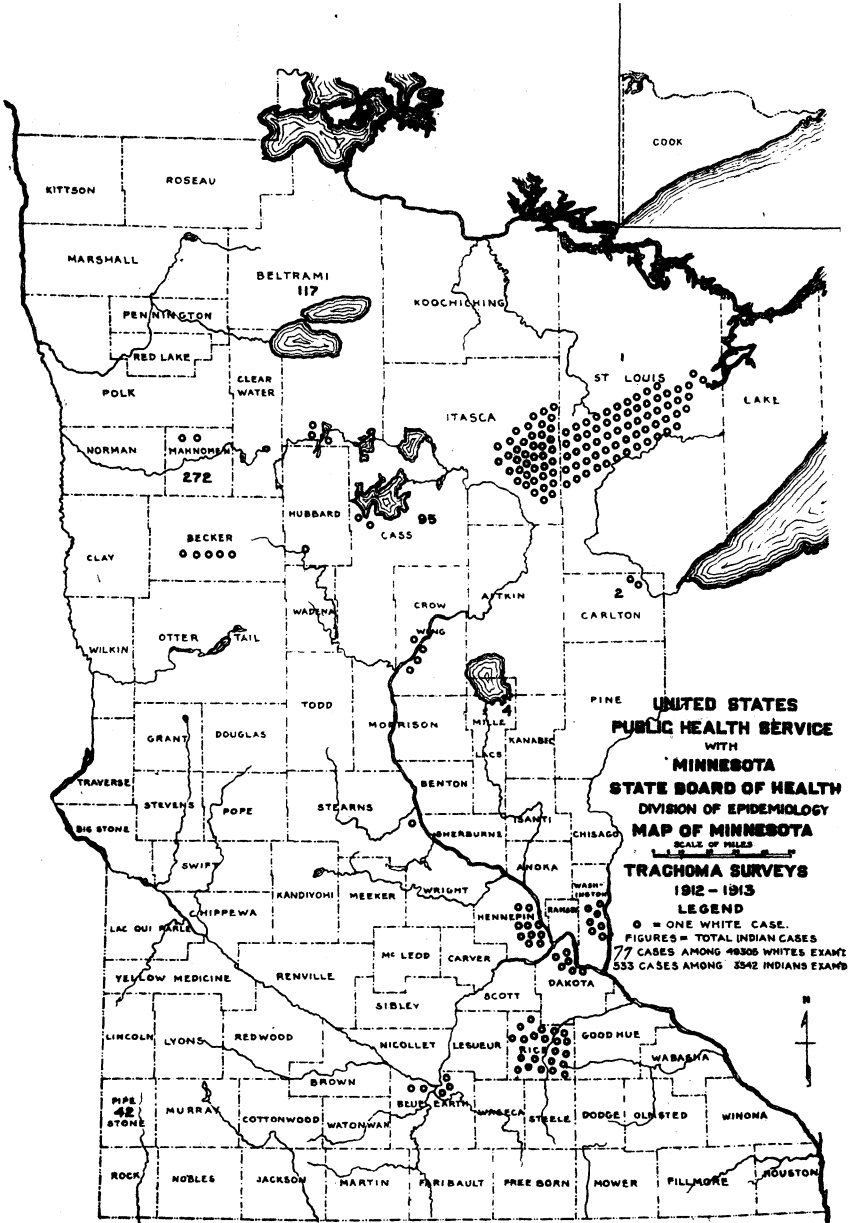
I was accompanied on each of the two surveys made at the request of the State board of health by a member of the staff, who acted as recorder. Thanks are due Dr. H. W. Hill for assistance rendered in the preliminary survey of the White Earth and Leech Lake Indian Reservations, and to Dr. A. J. Chesley, director of the division of epidemiology of the State department of health, who accompanied me during the survey of the mining region of the State and, recently, of the public schools and other institutions.

Credit is due and hereby given Dr. Chesley for the compilation of data and the preparation of maps. The State board of health was represented by Drs. Leonard and Burns in the investigation of trachoma and other diseases among the Indian population.

Especial thanks are due Dr. H. M. Bracken, secretary of the State board of health, for the many courtesies extended and facilities afforded during these investigations.



Map 1.—Showing localities visited. The circles (O) show the localities (schools and mines) where the white population was examined. The rectangles containing figures show the localities in which Indians were examined and the number examined.



Map 2.—Showing localities in which cases of trachoma were found. Each circle (O) indicates a case or suspected case or recurrent case found in a white person. The figures show the number of cases found in Indians.